

**REMARKS**

Reconsideration of the application as amended is respectfully requested.

The Examiner's communication dated July 28, 2006, which includes making the restriction requirement final, is acknowledged. The Examiner's indication of allowable subject matter in claims 14, 15, and 19 – 26 is acknowledged with thanks. Claims 14 and 19 have been amended to independent form as suggested by the Examiner, incorporating all the limitations of their base claims.

Claims 1 – 64 are pending. Of these, claims 36 – 64 are withdrawn from consideration under the restriction requirement. Claims 30, 32, 33, and 35 stand rejected under 35 USC § 112. Claims 1, 2, 4 – 9, 11 – 13, 16 – 18, and 27 – 34 stand rejected for obviousness under 35 USC § 103. Claims 3, 7, 14, 15, 19 – 26, 30, 32, 33, and 35 are objected to for various reasons, discussed below. Claim 10 is not mentioned explicitly in the office action, but is assumed to be at least objected to by virtue of being dependent upon a rejected claim.

By the present amendment, claims 14, 19, 30, 32, 33, and 35 are amended. After this amendment, claims 1 – 35 are pending, and claims 36 – 64 remain withdrawn from consideration.

**Objections to the claims**

Claims 3, 7, 14, 15, 19 – 26, 30, 32, 33, and 35 are objected to.

Claims 3 and 7 are objected to as being of improper dependent form for failure to limit the subject matter of a previous claim. Applicants respectfully submit that claim 3 is a proper product-by-process claim and is properly drafted in accordance with MPEP 608.01(n)(II)), which states: "Note, that although 37 CFR 1.75(c) requires the dependent claim to further limit a preceding claim, this rule does not apply to product-by-process claims."

Claim 7 recites: "The method of claim 1, wherein the chamber-forming step e) comprises the substeps of:

- i) depositing a layer of sacrificial material;
- ii) patterning the sacrificial material;
- iii) covering the sacrificial material with a suitable material to form a chamber roof; and
- iv) removing the sacrificial material."

Claim 7 incorporates all the limitations of claim 1, and paragraphs i) – iv), reciting additional substeps, clearly limit the subject matter of base claim 1 further.

Thus, neither of these claims is of improper dependent form. Applicants respectfully request that the objections to claims 3 and 7 be withdrawn.

Claims 14, 15, and 19 – 26 are objected to as being dependent upon a rejected base claim. Claims 14 and 19 have been amended to independent form as suggested by the Examiner, incorporating all the limitations of their base claims. Therefore, allowance of dependent claims 15 and 20 – 26 is also anticipated in accordance with the Examiner's indication of allowable subject matter.

Claims 30, 32, 33, and 35 are objected to for failing to claim structure limitations that affect the method in a manipulative sense. These claims are amended hereinabove, reciting manipulative limitations as required by the Examiner.

#### **Rejections under 35 USC § 112 traversed**

Claims 30, 32, 33, and 35 stand rejected under 35 USC § 112 for omitting essential steps necessary to adapt the openings. Applicants respectfully disagree that any essential steps have been omitted. Claims 30, 32, 33, and 35 recite further limitations of their respective parent claims; the respective parent claims themselves recite the essential steps. In each claim, the term "adapted" plainly means to make the opening fit for the respective use or situation stated in each claim. There is nothing indefinite about defining structures in terms of the functional attributes they must possess.

Nevertheless, in the interest of expediting prosecution, claims 30, 32, 33, and 35 are amended as recited hereinabove in further detail. Basis for the limitations inserted into these claims is found at least in FIG. 1A and at page 4 line 14 – page 5 line 23 of the specification as filed (paragraphs [0016] – [0022] of the published application). Withdrawal of the rejections under 35 USC § 112 is respectfully requested.

#### **Rejections under 35 USC § 103 traversed**

Claims 1, 2, 4 – 9, 11 – 13, 16 – 18, and 27 – 34 stand rejected for obviousness under 35 USC § 103. Each rejection under 35 USC § 103 is respectfully traversed in turn in the following discussion.

Claims 1, 2, 4 – 6, 16, and 17 stand rejected under 35 USC § 103 as being unpatentable over Jankowski et al. (US 2003/0039874). The Examiner states, without any evidence from the prior art, that “it would have been obvious... to fabricate a fuel cell having a chamber with an integral manifold for controlled flow of the reactants through the fuel cell” and states further that “the extension of the chamber over the entire anode maximizes the surface area available for the electrochemical reaction.” The motivation suggested by the Examiner is not supported by any reference to suggestions in the prior art to combine the elements of applicants’ invention as claimed. A hindsight-based statement of motivation is impermissible. Thus, a proper *prima facie* case for obviousness has not been made. Therefore, applicants respectfully request that the rejections of claims 1, 2, 4 – 6, 16, and 17 under 35 USC § 103 be withdrawn and that these claims be allowed.

Regarding claims 16 and 17 specifically, the Examiner remarks that applicants have not asserted any criticality to the order of completion of the steps and that the results do not appear to be dependent upon order. Applicants respectfully submit that intermediate results may, in fact, depend on the order in which steps are performed, and the intermediate results may be important to a user in using the claimed method. There is no requirement that criticality be asserted when claiming methods by claims of varying scope.

Claims 16 and 17 present method claims that properly differ in scope from claim 1 and from each other.

Claims 7 and 8 stand rejected under 35 USC § 103 as being unpatentable over Jankowski et al. (US 2003/0039874) in view of Sasahara et al. (US 2002/0012825). The Examiner states, again without any evidence from the prior art, that "it would have been obvious...to deposit and pattern the sacrificial material prior to the covering of it with an electrolyte roofing material." The motivations suggested by the Examiner ("allowing for transport channels" and improving "amount of surface area contact between the reactant and the electrolyte") is again not supported by any reference to suggestions in the prior art to combine the elements of applicants' invention as claimed. The Examiner correctly notes that Sasahara et al. use a sacrificial material to create voids within their electrolyte (paragraph 54). If this method of Sasahara et al. were combined with the structure of Jankowski, et al., the electrolytes 26 (FIGS. 1 and 2) or 75 (FIG.5) of Jankowski et al. would have voids, but the combined structure would not make the structure made by either of applicants' claim 7 or 8. For example, the combination of Sasahara's method with Jankowski's structure would not form the chamber of base claim 1 paragraph e), formed in part by covering a sacrificial material with a suitable material to form a chamber roof (claim 7 paragraph iii)).

Furthermore, the roofing material of claim 7 is not necessarily an electrolyte material as implied by the Examiner (Cf. claim 9, which recites in pertinent part: "wherein the suitable material is a non-electrolyte"). If the "suitable material" of claim 7 is a non-electrolyte, the improvement in an "amount of surface area contact between the reactant and the electrolyte" postulated by the Examiner as a motivation is not pertinent to claim 7. Thus, in that case the motivations suggested by the Examiner do not apply to claim 7, besides being unsupported by evidence from the prior art.

Thus, a proper *prima facie* case for obviousness has not been made. Therefore, applicants respectfully request that the rejections of claims 7 and 8 under 35 USC § 103 be withdrawn and that these claims be allowed.

Claims 9, 11, 12, and 13 stand rejected under 35 USC § 103 as being unpatentable over Jankowski et al. (US 2003/0039874). The Examiner states, again without any evidence from the prior art, that "it would have been obvious... to form a porous electrode under the chamber to ensure proper diffusion of the reactant to the electrolyte" and postulates additional motivation that "use of electrolyte or non-electrolyte material in constructing the chamber provides better control of ionic activity of the cell for the given conditions." Jankowski et al. do not mention control of ionic activity. The Examiner's postulated motivation appears to be impermissible hindsight. Perhaps the Examiner is relying upon personal knowledge in postulating this motivation; if so, an affidavit under 37 CFR §1.104 (d)(2) is respectfully requested.

Regarding claim 9, this claim depends upon claim 7, discussed above. Neither claim 7, nor claim 9, nor base claim 1 recites a porous electrode. Thus, the Examiner's postulated motivation for forming a porous electrode does not apply to claim 9.

Claim 11 does recite "The method of claim 1, wherein the chamber-forming step e) comprises the substeps of: i) forming a porous electrode, and ii) covering the porous electrode with a suitable material to form a chamber roof." It does not recite forming a porous electrode under the chamber, as implied by the Examiner's remarks. The Examiner cites paragraph 33 of Jankowski et al. as showing that the chamber roof is formed from the substrate material. That paragraph recites, in pertinent part, "... the substrate **44** being an upper component of the manifold assembly **42**." However, the same paragraph also describes the electrodes **46** and **54**: The anode electrode **46** is on the opposite side of substrate **44** from the manifold assembly, while the cathode electrode **54** is above and on the opposite side of electrolyte **53**, even further removed from manifold assembly **42**. Thus, the electrodes **46** and **54** of Jankowski et al. could not be formed by the method of claim 11, i.e. "covering the porous electrode with a suitable material to form a chamber roof" as recited in claim 11. Referring to the embodiment of FIG. 1 of Jankowski et al., also cited by the Examiner, substrates **14** and **16**

are not even in direct contact with electrodes **25** and **27**. Therefore, neither substrate **14** nor **16** could have been formed by the method of claims **11**, **12**, and **13**.

We conclude that a proper *prima facie* case for obviousness of claims **9**, **11**, **12**, and **13** has not been made. Therefore, applicants respectfully request that the rejections of claims **9**, **11**, **12**, and **13** under 35 USC § 103 be withdrawn and that these claims be allowed.

Claim **18** stands rejected under 35 USC § 103 as being unpatentable over Jankowski et al. (US 2003/0039874) in view of Wortman et al. (US 2004/0180252). The Examiner states that Wortman discloses that tape casting is a conventional method of forming electrode and electrolyte layers. However, Wortman et al. also states in the same paragraph that a "significant disadvantage of these conventional techniques is that obtaining the hermetic sealing required to keep the oxidizing gas flowpath and fuel gas flowpaths separated is difficult." Thus, Wortman et al. *teaches against* claim **18**. Thus the person of ordinary skill is also charged with knowledge of reasons *not* to use the method of applicant's claim. While the Examiner asserts that "it would be obvious ... to use the well-known method of tape casting to form the chamber," a proper *prima facie* case of obviousness is not made by a reference that teaches against the claim. Withdrawal of the rejection of claim **18** under 35 USC § 103 is respectfully requested.

Claim **27** stands rejected under 35 USC § 103 as being unpatentable over Jankowski et al. (US 2003/0039874) in view of Jacobson et al. (US 2004/0115503). The Examiner correctly notes that Jacobson et al. discloses tape calendaring and tape casting, and the use of liquid media, such as water, isopropanol, and other suitable organic solvents. However, claim **27** is dependent upon allowable claim **19**. No combination of Jankowski et al. with Jacobson et al. teaches or suggests all the limitations of claim **19** as amended. Thus, applicants respectfully suggest that claim **27** is also allowable. Withdrawal of the rejection of claim **27** under 35 USC § 103 is respectfully requested.

Claims 28 – 30 stand rejected under 35 USC § 103 as being unpatentable over Jankowski et al. (US 2003/0039874). Claims 31 – 34 stand rejected under 35 USC § 103 as being unpatentable over Jankowski et al. (US 2003/0039874). Claims 28 – 34 are all dependent upon claim 1. For the same reasons as stated hereinabove regarding claims 1, 2, 4 – 6, 16, and 17, applicants respectfully submit that a *prima facie* case for obviousness has not been made. Therefore, applicants respectfully request that the rejections of claims 28 – 34 under 35 USC § 103 be withdrawn and that these claims be allowed.

Applicants respectfully submit that U.S. Pat. No. 5,077,148 to Schora et al., considered pertinent, is less pertinent than the other references cited by the Examiner and discussed hereinabove. Sasahara et al. (US 2002/0012825) has also been discussed above.

### Conclusion

The claims rejected under 35 USC § 112 have been amended. Applicants respectfully submit that the none of the rejections under 35 USC § 103 presents a proper *prima facie* case of obviousness. Nevertheless, in order to more clearly state and distinctly claim what the applicants believe to be their invention, the claims are amended as recited in this amendment.

This response is believed to be fully responsive to each issue raised in the office action, but if the Examiner maintains any rejection, applicant would appreciate a more detailed explanation of precisely where in the references the combination is suggested and the relevant limitations are disclosed.

Applicants expressly reserve the right to file divisional and/or continuation applications with any of the canceled or non-elected claims, or with similar claims, or with claims to any subject matter disclosed in the present application or incorporated by reference.

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Applicants believe that the claims as amended are patentable over the prior art and respectfully request that the rejections be withdrawn and the claims allowed.

Respectfully submitted,

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